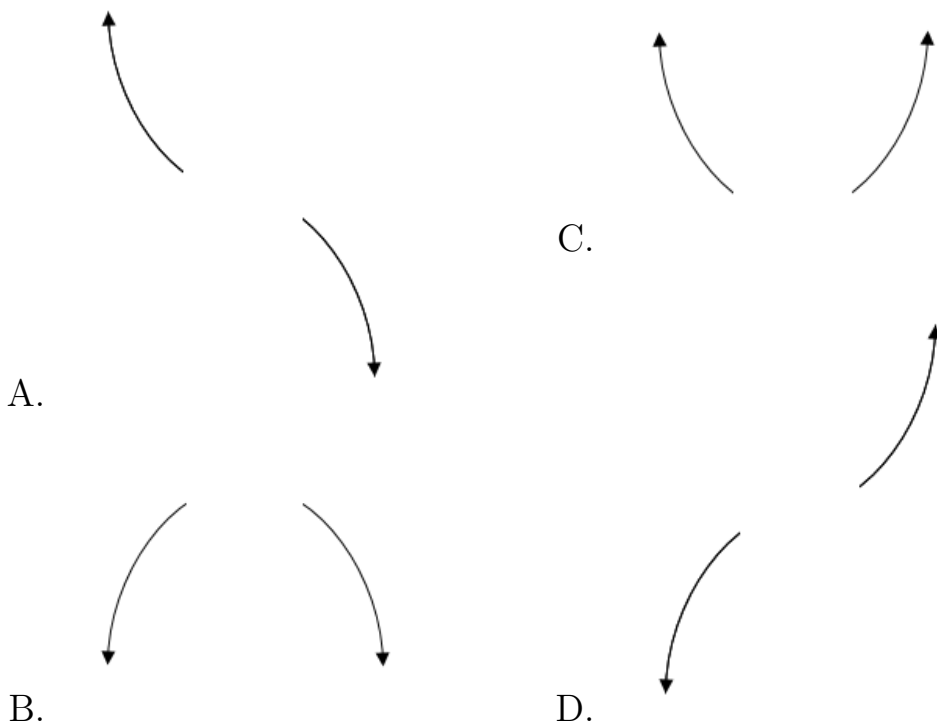1. Construct the lowest-degree polynomial given the zeros below. Then, choose the intervals that contain the coefficients of the polynomial in the form $ax^3 + bx^2 + cx + d$.

$$\frac{4}{3}, \frac{2}{3}, \text{ and } \frac{3}{5}$$

A. $a \in [43, 49], b \in [-121, -109], c \in [94, 102], \text{ and } d \in [-30, -23]$

B. $a \in [43, 49], b \in [115, 126], c \in [94, 102], \text{ and } d \in [24, 25]$

C. $a \in [43, 49], b \in [2, 5], c \in [-61, -52], \text{ and } d \in [24, 25]$

D. $a \in [43, 49], b \in [63, 65], c \in [-21, -6], \text{ and } d \in [-30, -23]$

E. $a \in [43, 49], b \in [-121, -109], c \in [94, 102], \text{ and } d \in [24, 25]$

2. Describe the end behavior of the polynomial below.

$$f(x) = 8(x - 9)^5(x + 9)^{10}(x - 3)^3(x + 3)^5$$

C.

A.

B.   D.

E. None of the above.

3. Construct the lowest-degree polynomial given the zeros below. Then, choose the intervals that contain the coefficients of the polynomial in the form $x^3 + bx^2 + cx + d$.

$$2 + 4i \text{ and } 1$$

A. $b \in [4.8, 7.3], c \in [22.72, 24.73]$, and $d \in [18.8, 23.2]$

B. $b \in [-0.5, 1.6], c \in [-4.03, -2.68]$, and $d \in [0.5, 2.3]$

C. $b \in [-8.6, -2.1], c \in [22.72, 24.73]$, and $d \in [-21.3, -19.8]$

D. $b \in [-0.5, 1.6], c \in [-5.22, -3.99]$, and $d \in [2.7, 7]$
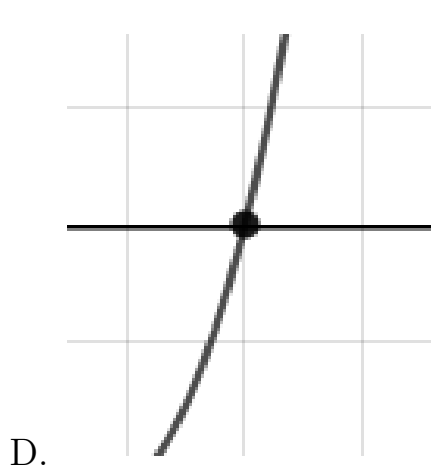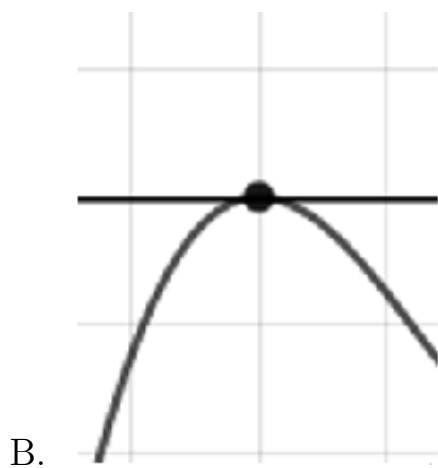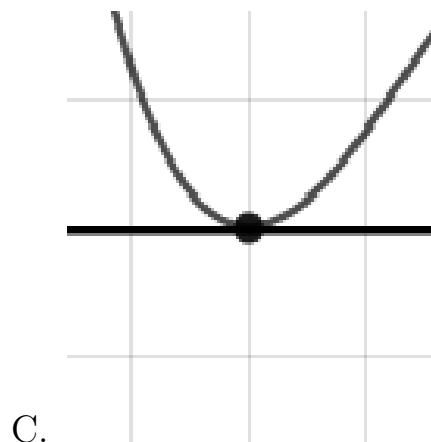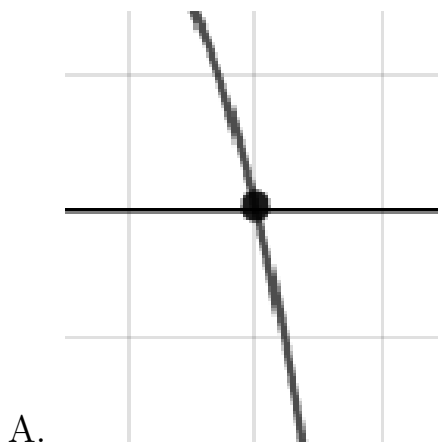
E. None of the above.

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4. Which of the following equations *could* be of the graph presented below?
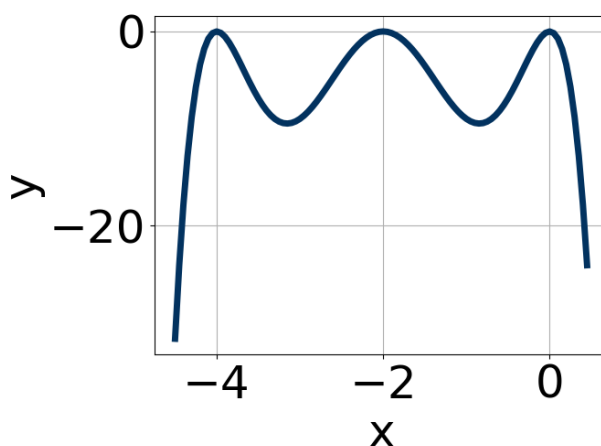
A. $18x^5(x + 2)^8(x + 4)^4$

B. $9x^{10}(x + 2)^8(x + 4)^6$

C. $-6x^5(x + 2)^8(x + 4)^6$

D. $-3x^4(x + 2)^8(x + 4)^8$

E. $-14x^5(x + 2)^6(x + 4)^5$

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5. Describe the zero behavior of the zero $x = 9$ of the polynomial below.
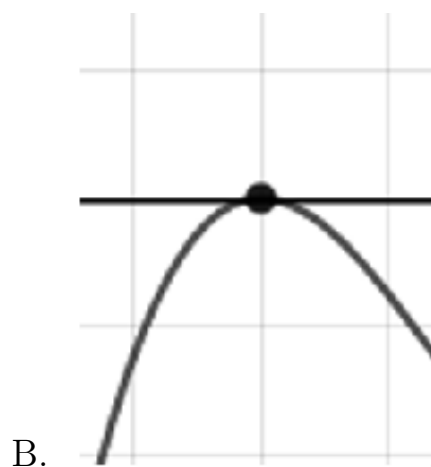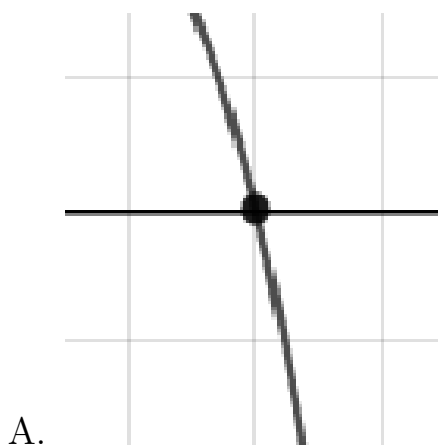$$f(x) = 9(x - 3)^{11}(x + 3)^8(x - 9)^{10}(x + 9)^9$$

A.

C.

B.

D.

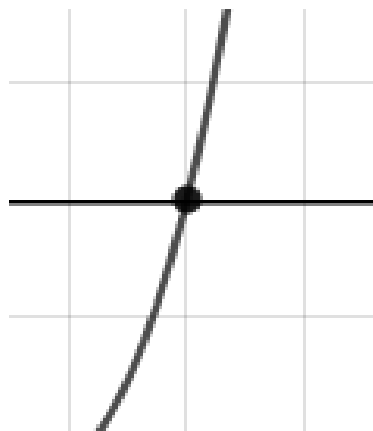E. None of the above.

6. Describe the zero behavior of the zero $x = 4$ of the polynomial below.
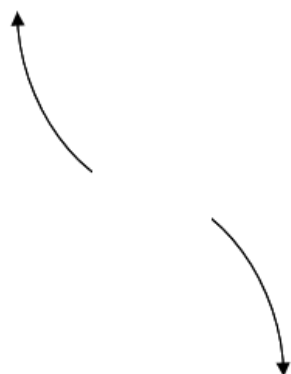
$$f(x) = 5(x + 6)^5(x - 6)^4(x + 4)^9(x - 4)^6$$
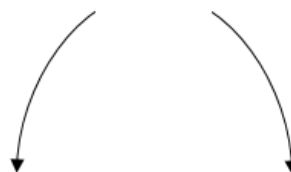
A.

B.

C.

D.

E. None of the above.

---

7. Describe the end behavior of the polynomial below.

$$f(x) = 2(x + 4)^3(x - 4)^8(x - 5)^5(x + 5)^6$$

C.

A.

B.

D.

E. None of the above.

---

8. Construct the lowest-degree polynomial given the zeros below. Then, choose the intervals that contain the coefficients of the polynomial in the form $x^3 + bx^2 + cx + d$.

$$-4 - 3i \text{ and } 1$$

A. $b \in [-2.3, 1.9], c \in [1.81, 2.56]$, and $d \in [-3.42, -2.96]$

B. $b \in [-8.3, -5.2], c \in [15.94, 17.54]$, and $d \in [24.44, 26.01]$

C. $b \in [4.9, 8.8], c \in [15.94, 17.54]$, and $d \in [-26.86, -23.36]$

D. $b \in [-2.3, 1.9], c \in [2.49, 3.29]$, and $d \in [-4.03, -3.82]$

E. None of the above.

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9. Construct the lowest-degree polynomial given the zeros below. Then, choose the intervals that contain the coefficients of the polynomial in the form $ax^3 + bx^2 + cx + d$.

$$\frac{-7}{4}, \frac{7}{2}, \text{ and } \frac{-3}{5}$$

A. $a \in [33, 45], b \in [-46, -44], c \in [-295, -277]$, and $d \in [-147, -143]$

B. $a \in [33, 45], b \in [90, 98], c \in [-205, -195]$, and $d \in [-147, -143]$

C. $a \in [33, 45], b \in [35, 50], c \in [-295, -277]$, and $d \in [146, 151]$

D. $a \in [33, 45], b \in [-186, -184], c \in [111, 127]$, and $d \in [146, 151]$

E. $a \in [33, 45], b \in [-46, -44], c \in [-295, -277]$, and $d \in [146, 151]$

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10. Which of the following equations *could* be of the graph presented below?
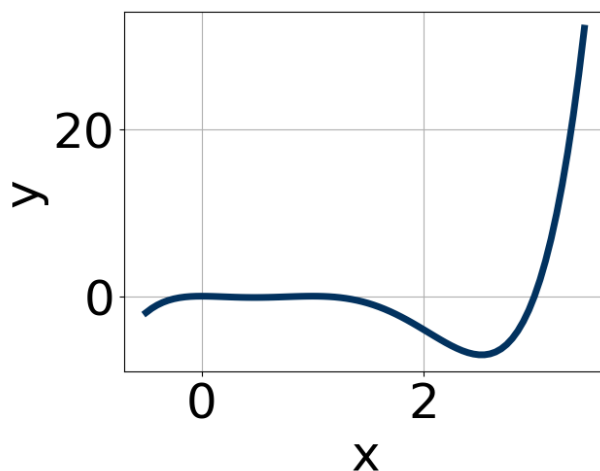
A. $6x^9(x-1)^4(x-3)^5$

B. $19x^{11}(x-1)^8(x-3)^6$

C. $9x^4(x-1)^{10}(x-3)^9$

D. $-8x^{10}(x-1)^8(x-3)^7$

E. $-11x^4(x-1)^8(x-3)^8$